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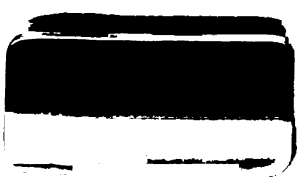

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I - Introduction

Until the year 1892 there was no American nor foreign law relating to milk supply that aimed at anything else than to prevent skimming and adulteration of milk. Probably the earliest record of thought in this country along the line of safeguarding the public health by securing a bacteriologically clean milk is found in the report of the Massachusetts Board of Health for the year 1884. In this report attention is called to the fact that the state food and drugs act provided for a chemical analysis of milk, that such analysis can not reveal the dangers from contaminated milk, and that therefore sanitary conditions should be required in the feeding, stabling, and other care of cows. The earliest obtainable record of foreign thought on the subject of bacteriologically clean milk in relation to human health is found in an article published in 1890* The writer of the article reviews the then extant knowledge of bacteria in milk, indicates how bacterial contamination of milk may occur, and points out two sources of danger to consumers of bacteria laden milk: first, ptomaine poisons; and second, disease producing bacteria.

Although some knowledge of bacteria in milk was developed previous to 1892#, and although a few people were conscious of the dangers to health in the consumption of contaminated milk, there was neither any plan nor any law operating to regulate the production of milk from the human health standpoint. There was no municipal sanitary control of a milk supply. This came later and for the first time in the city of Washington, D. C., in 1894. Since then, or in the period from

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*Oosterreich Monattsch. fur Thierheilkunde.

#Bul. 18, Wis. Exp. St'n, and Bul. 4, Conn. (Storrs)Stn.

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1893 to 1913, there has been a rapid development in the standards and conditions for the production and handling of milk. Certified milk has played a leading part in this improvement.

II - Certified Milk

1 - Origin of Term

Beginning in 1888 The Medical Society of New Jersey began a crusade, which lasted for five years, with a view to bring about improved conditions in milk production.[1] During that time an unsuccessful effort was made to secure state legislation for the sanitary control of dairies. Failing in this, the society considered ways and means to exercise such control themselves, and, in pursuance of a plan proposed by Dr. Henry L. Coit, The Medical Milk Commission of Essex County, N. J., was organized on April 13, 1893. On May 19th of this year the commission entered into a contract with Stephen Francisco, who was to produce milk according to regulations, and on June 14th of the same year the first certificate was issued. The term "certified milk" was coined by Dr. Coit in connection with this idea of issuing a certificate to the dairyman. The term was copy-righted by Mr. Francisco on Oct. 16, 1904.

2 - Definition

As defined by The American Association of Medical Milk Commissions in conference in 1912, "Certified milk is the product of dairies operated in accordance with accepted rules and regulations formulated by authorized medical milk commissions, to insure its purity and adaptability for infants and invalids".[2]

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[1] Public Health & Marine Hospital Service - Bul. 56.

[2] Public Health Reports - Bul. 85.

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III - MEDICAL MILK COMMISSIONS

1 - Definition

A medical milk commission is a body of men, preferably no less than nine, appointed by a duly chartered medical society, under which and for which it acts, and charged with the duty of encouraging the production of milk in conformity with regulations endorsed by the society.

Hitherto milk commissions have been largely independent in the matter of organization and methods, and have differed widely[1]. The purpose, organization, and methods of work of a typical commission can best be set forth in a description of The Medical Milk Commission of Essex County, N. J.:

2 - Objects

The objects of the commission are to establish correct clinical standards of purity for cow's milk; to become responsible for a periodical inspection of the dairy under its patronage; provide for chemical and biological examinations of the product, and the frequent scrutiny of the employees by a physician, and of the stock by competent veterinarians.[2]

3 - Organization

In the organization of the commission a body of people (twelve at present) is selected by the medical society. This group elects a president, and a secretary, appoints four committees, and employs six experts. The experts employed are (1) a chemist, who analyzes the milk; (2) a bacteriologist, who examines the milk; (3) a veterinarian, who examines the cattle;

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[1] Page 25, this thesis.

[2] 23rd Rep't, Med. Milk Com'n, Essex Co., N. J.

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(4) a physician, who examines the employees; (5) a consulting veterinarian, and (6) a consulting specialist on dairy hygiene, whose advice is sought upon occasion.

Each of the committees consists of a chairman and two other members. The following are the committees:

(a) - A committee on dairy hygiene.

(b) - A committee on veterinary inspection.

(c) - A committee on sanitation.

(d) - A committee on chemical and bacteriological examinations and standards.

4 - Methods

The commission enters into an agreement with a dairyman for the production of milk under supervision and according to regulations. The routine of work then consists of semi-monthly meetings to receive the reports of its committees and experts, and to issue a certificate to the dairyman. At least one member of each committee makes a visit each month to the dairy. In case of the development of suspicious symptoms in men or cows in the dairy, the proper specialist is to be notified immediately. The specialist makes an examination, and notifies the secretary of the commission, who promptly notifies the chairman of the proper committee. The committee then takes the matter in charge, does that which it thinks is wisest, and reports to the commission at the special meeting which was called in the meantime by the secretary. The commission then takes charge of the matter.

The members of this commission work without pay. The expenses of the commission are met by a fee assessed upon the dairyman. Some other commissions meet expenses by selling bottle caps to the dairymen.

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5 - Development

Because it is impossible to get complete information from all medical milk commissions, and because much information that can be obtained is inaccurate, the status and activities of these commissions can not be determined. Table I is arranged from information obtained from the Federal Department of Agriculture[1], and through The American Association of Medical Milk Commissions. It shows the number and distribution of commissions in the years 1907 and 1912.

TABLE I

Number and Distribution of Milk Commissions in America

State	1907	1912	Increase 1907 to 1912
New York	5	12	7
New Jersey	1	6	5
Ohio	4	5	1
Pennsylvania	1	4	3
Massachusetts	2	4	2
Connecticut	0	3	3
Michigan	1	3	2
Illinois	1	3	2
California	2	3	1
Missouri	1	2	1
Colorado	0	1	1
Ottawa (Dom Can)	0	1	1
Wisconsin	1	1	0
Minnesoto	1	1	0
Indiana	0	1	1
Washington	0	1	1
West Virginia	0	1	1
Florida	0	1	1
Louisiana	0	1	1
Total	20	54	34

This table shows that only 3 commissions, 5.5 per cent. of the total number, exist in southern states. Seventy-five per cent. of the total number are east of the Mississippi River and north of the Mason and Dixon line. Five states - New York, New

[1]U. S. Dep't of Agriculture, B.A.I. Bul. 104.

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Jersey, Pennsylvania, Ohio, and Massachusetts - have more than 57 per cent.of all the milk commissions in America. A number of these commissions certify many dairies (one has 20 dairies), and among these dairies are a number of the largest milk producing plants in the world. It is probable that over 75 per cent. of America's certified milk is produced in these five states.

6 - Distribution

Although table I shows how many commissions are in the different states, and what has been the increase in the number of commissions in the several states and in the entire country, it does not show how they are distributed within the states. In most cases the milk commissions in any certain state are located within, or near-by, one or a few of the largest cities in the state.

7 - American Association of Medical Milk Commissions

The local milk commissions federated themselves during June, 1907, into the American Association of Medical Milk Commissions. The objects of the association, as stated in its constitution, are, "to exchange views and to adopt uniform methods of procedure in the work of the medical milk commissions; to determine the scope of veterinary inspections; and to foster and to encourage the establishment of medical milk commissions in other cities". The method by which the association works is through committees, chiefly, which investigate definite problems related to the work of milk commissions, and report at the annual meetings. There is a president, a secretary, and a governing council consisting of five members in addition to the officers. As indicating its organization for work, it is pertinent to note the standing committees in 1912, which were one on medical

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examination of employees, one on chemical standards, one on bacteriological standards, one on veterinary inspection and protection against tuberculosis, and one on statistics of infant mortality and infants' milk charities.

The medical milk commission, however, is but one member of a team which is necessary to the production of certified milk. The dairyman who will produce such milk is the other member of this team, and is quite as important in the work as is the commission.

IV - Production of Certified Milk

1 - The Certified Milk Producers' Association of America

In 1908 the dairymen producing certified milk organized The Certified Milk Producers' Association of America, with this object: "To promote the interests of producers of certified milk by giving its members opportunity to become better acquainted, and to exchange ideas which will result in mutual bebefit and greater uniformity in the production and marketing of their product". This association works chiefly through an executive committee of eight members, and special committees upon occasion, which report at the annual meetings.

2 - Development of Certified Dairies

(a) - Increase in total number

During 1912 the Dairy Division of the U. S. Dep't of Agriculture was able to gather data from 92 dairies out of a total of 125 certified dairies. Table II is a comparison of data obtained in 1912 with similar data obtained in 1907.

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TABLE II

Increase in Quantity of Certified Milk Produced

	1907	1912	Absolute increase	Increase %
Section 1				
No.Dairies rep't'g,	33	92	59	178.
Av.No.Cows to dairy,	96	88	-8	-8.3
Total quts. daily,	25,432	66,532	41,100	161.
Av. Quts. daily,	770	732.8	-37.2	-4.8
Av. Quts. per cow,	8.02	8.3	0.3	.037
Section 2				
Total No. dairies,	50	125	75	150.
Est.Tot'l prod'n, qut's daily,	37,500	91,600	54,100	135.

Section 2 of this table presents estimates of total daily yields, the estimates being based on the data contained in section 1 of the table. There was an average yearly increase of 12 in the number of dairies reporting, and of 2,000 in the number of gallons of milk produced by these dairies. The number of cows per dairy decreased, and the total production per dairy also decreased. The average production per cow increased.

(b) - Certified dairies in New York

In 1910 there were 27 certified dairies in New York state alone. Conditions in the certified milk business in this state may be assumed to indicate the general status of the industry. Tables III, IV, V, VI, and VII present data gathered in a study of these conditions.

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Table III

Production and Sale of Certified Milk in N. Y.

Farm	No.Quts.daily when starting	No.Quts. daily now	Miles dist. from market	Milk bt. on farm	M'k sd. direct
1	500	730	25	Yes	No
2	500	650	64	No	Yes
3	400	400	60	No	No
4	190	650	66	Yes	No
5	600	600	60	Yes	(Some)
6	100	120	80	Yes	No
7	---	400	77	Yes	No
8	50	200	1.5	Yes	Yes
9	200	200	153	No	No
10	---	800	200	No	No
11	120	500	195	Yes	No
12	200	390	195	Yes	No
13	7	200	43	Yes	No
14	---	500	287	Yes	No
15	24	350	243	Yes	No
16	240	180	252	Yes	No
17	800	2000	267	Yes	No
18	50	350	3.5	Yes	Yes
19	50	140	1	Yes	Yes
20	100	120	1	Yes	Yes
21	288	450	228	Yes	No
22	200	400	238	Yes	No
23	50	250	3	Yes	Yes
24	34	60	51	Yes	Yes
25	12	425	19	Yes	No

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TABLE III
(continued)

Production and Sale of Certified Milk in N. Y.

Farm	No.Quts.daily when starting	No.Quts. daily now	Miles dist. from market	Milk btd. on farm	M'k sld. direct
26	---	600	17	Yes	No
27	20	400	2	Yes	(Some)
Aver.		537.6	104.8		

This table (No. III) shows that some farms began with a very small output of certified milk. Farm 13 started with 7 quarts, farm 25 with 12 quarts, and farm 27 with 20 quarts daily. Production was increased on all farms reporting, excepting farms 5, 9, and 16. On 23 of the farms the daily output had been increased on the average from 205.8 quarts to 424.5 quarts, or to the extent of218.7 quarts. Most of the certified milk is bottled by the producers on the farms - only four dairymen ship the milk in cans. In the majority of cases the milk is sold through a dealer. Six of the ten farms which do any direct selling of milk are located close to the market.

Information was obtained concerning the breeds of cows used for the production of certified milk. Table IV contains data on this subject. Section 1 gives the total number of farms using cows of a specified breed. Section 2 gives the number of farms on which there are registered cows of the different breeds.

TABLE IV

Section 1

Number of	:Jersey:	Holstein:	Guernsey:	Ayrshire:	Brown Swiss:	Native:	Durham
Farms -	19	18	12	4	1	8	5

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TABLE IV
(continued)

Number of Certified Milk Farms Using Cows of a Specified Breed

Section 2

	Registered Jerseys	Registered Holsteins	Registered Guernseys	Registered Ayrshires	Registered Brown Swiss
Number of farms -	5	4	5	1	1

This table (No. IV) shows that Jersey, Holstein, and Guernsey cattle are used on nearly an equal number of farms. It was found also that the distribution of cattle was, (1) nothing but registered stock (Guernseys) on 2 farms; (2) both registered stock and grades or natives on 9 farms; and (3) nothing but grades or natives on 16 farms. The grade and native cows together were far the most numerous.

A comparison of the sums of money invested in stables, in dairy houses, and in equipment on the different farms is made in table V. This table shows that new stables were erected on all but 3 of the 26 farms reporting, and new dairy houses were put up on all but 7 of the 27 farms. On 17 farms the investment of money in new stables and dairy houses averaged $20.00 per quart of the daily output of milk. Assuming that the cows averaged a yield of 8 quarts of milk a day, the investment of money in new buildings averaged $160.00 a cow.

The investment in new buildings and equipment on 17 farms averaged $23.77 for every quart of milk produced daily. Assuming that the cows averaged a yield of 8 quarts a day, the investment of money in new buildings and equipment on 17 farms averaged $189.16 a cow. The cost of dairy house equipment varies from less than $1.00 to over $14.00 per quart of daily output.

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TABLE V

Barns and Dairy Houses on Certified Milk Farms in N. Y.

Farm	New Stable	New Dairy	Cost New Stable $	Cost New Dairy $	Cost Equip't Dairy $	Total Inv't $	Daily Prod'n Quarts	Inv't per Qut. daily Output $
1	Yes	Yes	50,000	15000	7,000	72,000	730	98.63
2	No	No			700	700	650	1.07
3	Yes	Yes	6,000	1800	500	8,300	400	20.75
4	Yes	No	5,000		525	5,525	650	8.50
5	Yes	Yes	10,000	5000	3,500	18,500	600	30.83
6	Yes	Yes			100		120	
7	Yes	Yes	8,000	1500	400	9,900	400	24.75
8	Yes	Yes		5000	2,500		200	
9	Yes	No	1,600				200	
10	Yes	Yes	10,000				800	
11	Yes	Yes	3,000	3000	1,000	7,000	500	14.00
12	Yes	Yes	4,000	2000	800	6,800	390	17.43
13	Yes	Yes	700	600	600	1,900	200	9.50
14	Yes	No	45,000		1,000	46,000	500	92.00
15	Yes	Yes	3,500	3200	800	7,500	350	21.42
16	Yes	Yes		300	300		180	
17	Yes	Yes						
18	Yes	Yes	3,000	1000	500	4,500	350	12.85
19	Yes	No	1,000		2,000	3,000	140	21.42
20	Yes	Yes		400	175		120	
21	Yes	Yes		500	475		450	
22	No	Yes		1000	750	1,750	400	4.37
23	Yes	Yes		3500	300		250	
24	No	Yes		250	250	500	60	8.33
25		No			500		425	
26	Yes	Yes	5,000	800	1,000	6,800	600	11.33
27	Yes	No	2,500		300	2,800	400	7.00
Aver.-			9,517	2584	1,082	11,969		23.77

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Information was obtained on the cost of remodelling buildings, but this could not be given in table V. Four dairy houses were reconstructed at an average cost of $312.00, or at a cost of 50 cents per quart of milk produced daily. Five stables were reconstructed at an average cost of $1,140.00, or at a cost of $3.25 per quart of milk produced daily.

Data was also secured relative to the use of concrete floors under the cows, and the use of storage lofts in the stables. This data is contained in table VI, which also contains a summary of tables III, IV, and V.

Table VI shows that two-thirds of the certified farms reporting use storage lofts in the barns, and five-sixth of all farms reporting find the concrete stable floor to be satisfactory.

The findings in this study are important because, as previously stated, they may be regarded as indicating the conditions which prevail generally in the certified milk business. There may be one exception to this, namely the average distance from market, which is rather great in the case of the New York dairies. The study shows that the quantity of certified milk produced is increasing from year to year; that no certain breed of cows is preferred for the production of certified milk, and that grade and native cattle are used on many certified milk farms. There is wide variation in the amount of money invested per quart of milk produced on different farms, but the general tendency is toward a rather heavy investment in new buildings with concrete floors, and in new dairy houses with expensive equipment. The study also shows that most of the certified milk is bottled on the farm, and is sold through dealers.

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TABLE VI

Summary of Data in Tables III, IV, and V

	Farms Rep't'g:	Av. per Farm	Farms Replying :Yes	Farms Replying :No
Miles dist. from market	27	104.8		
Milk sold direct	25		6	19
Milk bottled on farm	27		23	4
New dairy stable	26		19	7
New dairy house	25		20	5
Remodelled stable	26		6	1
Storage loft in stable	20		13	7
Concrete floor satisf'y	19		15	4
Cost new stable, dollars		9,517		
Cost rebuilt stable, "		1,140		
Cost new dairy house "		2,584		
Cost remodell'g d. hou."		312		
Cost equipment, " " "		1,082		
Quts milk daily at start	23	205.8		
Quts milk daily now	23	424.5		

3 - Cost of Production and Selling Price of Certified Milk

No data could be obtained to show the cost of producing certified milk on any considerable number of farms. The cost was estimated on four farms in Wisconsin and was found to vary from 6.03 cents to 9.1 cents a quart.[1] Table VII presents data for New York dairies, and gives some suggestion as to cost of production.

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1 - Earl Polly, Thesis in 1913, Univ. Wis.

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TABLE VII

Selling Price and Profitability of Certified Milk

Farm:	Price per qut. Direct sell'g: ¢	Net price qut. Indirect sell'g: ¢	Is cert. milk Profitable?	What would be a Profitable price? ¢
1		10	No	12
2			Yes	
4		8	No	15
5	12		No	
6		7	Yes	
7		7.5		8.33
8	12		Yes	
9		6	No	
10		10	No	20
11		7		
12			Yes	
13	14		No	15
14		8.5	No	9
15		7	Yes	7.5
16		7	No	
17		7.5	No	8
18	10		Yes	
19	10		No	12
20	10		NO	12
21		7.5	Yes	
22		7.5	Yes	
23	10		No	12
24		7		8
25		7	Yes	
27		7	Yes	
Aver.-	11.1	7.6		11.56

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Table VII shows that 11.1 cents is the average price received per quart of milk on 7 farms which sell direct. On the 16 farms which sell through dealers the average net price received per quart is 7.6 cents. Three farms selling direct think they ought to receive 13 cents a quart in order to derive any profit from certified milk. Two of these 3 farms are close to market. Nine of the 11 farms which sell through dealers think that they ought to receive 11.56cts. a quart in order to derive any profit from their certified milk. Of 22 farmers reporting, 10 believe that the production of certified milk is profitable, and 12 believe that it is unprofitable.

Judging from the price which these producers say they ought to receive for certified milk, the cost of production probably averages about 10 cents a quart.

The average retail price for certified milk in 28 different cities in 1911 was 14.5 cents. The Federal Dairy Division reports for 1912 an average price in cities (number not stated) of 14.2 cents.[1]

4 - The "North" System of Milk Production

(a)- Bacterial content

Few people use certified milk because it is relatively high in price. Realizing this, a Dr. North of New York city has been promoting the so-called "North" system of milk production, which he claims will result in a product equal in quality to certified milk, and costing much less. This system proposes the washing and sterilization of milk vessels at a central place (the shipping station), so as to avoid the necessity of expenditure for equipment to do this work on each farm, as must be done for

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[1] U. S. Dep't Agr., B.A.I. Bul. No.I

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certified milk. It provides for the use of small-top milking pails, and for the payment of a premium of one-half cent a gallon for milk from tuberculin-tested herds. It is claimed for this system that it is adapted for use on all farms and in all kinds of stables; that it will result in a milk "under 10,000" bacteria per cubic centimeter;[1] and that the increased cost to the dairy farmer in obtaining this result "is less than 1 cent a quart"[2] which is one-sixth of the extra cost of certified milk. A study of results obtained with the "North" system in operation at Sparks, Md., during a period of 6 months is presented in table VIII.

TABLE VIII

Bacterial Content of "North" Milk

Month	No.of Patrons	No.of Counts	Aver.No.Bacteria per cc
June	29	81	33,372
July	24	68	39,494
August	22	76	29,686
Sept.	20	70	25,084
Oct.	19	56	32,202
Nov.	19	19	35,032
Aver.	22	62	32,478

Where possible, bacterial counts were secured on the 2d, 9th, 16th, and 23rd of each month, except for November, when counts were obtained for but one date. The milk for these counts was taken at the time of delivery at the creamery (at railroad

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[1] Fourth Ann. Rep't, Cert. Milk Prod. Ass'n of Am., p 52.

[2] Milk Dealer, Jul. 1913, p 8.

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station) when the milk was no more than 14 hours old. The platings were made within a few hours after the samples were taken. When samples of certified milk are taken for plating, the milk frequently is 50 or more hours old - has had from 2½ to 3 times as much time to develop bacteria - and must then contain less than 10,000 bacteria per cubic centimeter. The table shows that the bacterial content of the milk did not average "under 10,000", but that it ran considerably over 3 times 10,000, even at the shipping point. What this same milk might have shown in bacterial content if it had first been transported to the city and carried on delivery routes can not be estimated easily, since there is no comprehensive data available anywhere to show the rate of increase of bacteria in milk during transportation under any given set of conditions. Among the counts summarized in the table, the lowest two were 3,300 and 5,200; and the highest two 106,000 and 128,000 respectively. Counts of milk under this system have run as high as 167,000. A study of the bacterial counts on the two farms having the cleanest milk showed that the average of 16 counts during 6 months was 7,606 on farm A, and 10,025 on farm B.

The cost of producing milk on these two farms (A and B) was investigated and the data arranged in table IX . The yield of milk and the cost of feed had been determined by weighings, records, and calculations made regularly by a representative of the Federal Dairy Division in cow-test association work. His figures for these items were accepted and used. Although the cost items for labor, ice, etc., were obtained under summer conditions, they were tabulated on the basis of a one-year period. On farm A the cattle were not tuberculin tested. On farm B the cattle were tuberculin tested.

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TABLE IX

Cost of Producing Milk on Farms by the "North" System

	Farm A	Farm B
Investment in buildings	$2500.00	$2000.00
" " yards	6.00	20.00
" " utensils	28.00	30.25
" " delivery outfit	50.00	177,00
" " cows	495.00	1150.00
" " water system		35.00
" " bull	75.00	150.00
Total investment	3154.00	3562.25
Cost of labor	480.00	1173.05
" time horse delivering	58.40	200.00
" cow-test'g assoc'n	17.00	38.00
" ice	30.00	
" insurance	11.10	29.72
" taxes	35.09	28.56
" miscellaneous expenses	5.00	5.75
" 16 T straw @ $5.00, 34T @ $4.00	80.00	136.00
Cost total sundry expenses	716.59	1611.08

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TABLE IX
(continued)

Cost of Producing Milk on Farms by the "North " System

	Farm A	Farm B
Depreciation in buildings	$125.00	$100.00
" " utensils	5.00	6.05
" " delivery outfit	10.00	35.40
" " cows	59.40	138.00
" " water system		1.40
" " bull	9.00	18.00
Interest on investment	157.70	178.11
Sundry expenses	716.59	1611.08
Total expenses	1083.29	2088.04

Returns,	Farm A;	Farm B;
	Calves, $ 16.50	Calves, $ 34.
	Manure, 165.00	Manure, 345.
Total returns	181.50	379.00
Net expenses	847.79	1709.04
Net expense per 100 lbs. milk (83,271 lbs., Farm B) (59,857 lbs., Farm A)	1.417	2.05
Cost feed per 100 lbs. milk	1.21	1.24
Total net cost per 100 lbs. milk	2.627	3.29
Cost pergallon milk	0.226	0.282
Cost per quart of milk	0.0565	0.0705

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TABLE X

Cost of Producing Milk on Farms C and D by the "North" System

	Farm C	Farm D
Investment in buildings	$1347.00	$ 600.00
Investment in yards	8.00	100.00
" " utensils	30.00	66.00
" " delivery outfit	25.00	275.00
" " cows	990.00	2250.00
" " water system	35.00	
" " bulls	120.00	50.00
Total investment	2555.00	3341.00
Cost of labor	504.00	1303.00
" time horse delivering	20.00	365.00
" cow-test'g assoc'n	30.00	70.00
" ice	20.00	
" insurance	3.20	10.00
" taxes	27.59	37.19
" miscellaneous expenses	7.00	14.00
" 27T straw @$5.00, 40T @$4.00	135.00	160.00
Cost total sundry expenses	746.79	1959.19

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TABLE X
(continued)

Cost of Producing Milk on Farms C and D by the "North" System

	Farm C	Farm D
Depreciation in buildings	$ 67.35	$ 30.00
" " utensils	6.00	13.20
" " delivery outfit	5.00	55.00
" " cows	118.80	270.00
" " water system	2.10	
" " bulls	14.40	6.00
Interest on investment	127.75	167.05
Sundry expenses	746.79	1959.19
Total expenses	1088.19	2500.44
Returns, Farm C; Farm D;		
Calves, $34.00 Calves, $76.		
Manure, 330.00 Manure, 750.		
Total returns	364.00	826.00
Net expenses	724.19	1674.44
Net expense per 100 lbs. milk (103,990 lbs., Farm C) (245,950 lbs., Farm D)	0.696	0.68
Cost feed per 100 lbs. milk	1.019	0.89
Total net cost per 100 lbs. milk	1.715	1.5708
Cost per gallon of milk	0.147	0.1354
Cost per quart of milk	0.03675	0.0338

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Table IX shows that the cost of a quat of milk on farm A was 5.65 cents, and on farm B the cost was 7.05 cents. The stable on farm A is new and built according to specifications furnished by the Federal Dairy Division. The stable on farm B is a reconstructed stable, but requires more work to keep clean. Both stables have concrete floors. Some reasons for the greater cost of production on farm B are the larger expense for hauling (due to greater distance from the creamery), and the greater cost of labor.

In contrast to farms A and B are the other two farms, C and D. Table X presents data relative to the cost of production on farms C and D. The cost of a quart of milk on farm C is 3.675 cents, and on farm D it is 3.385 cents. Asummary of the bacteria counts of milk for these two farms showed that the average of 16 counts during 6 months was 31,133 for farm C, and 41,235 for farm D. In the case of these two farms a lower bacterial content of the milk accompanied a lower cost of production. The stable on farm C is a completely rebuilt stable. That on farm D is old and exceedingly delapidated. On neither of these farms are the cattle tuberculin tested. A comparison of bacteria counts and costs of production on these four farms is made in table XI.

TABLE XI

Bacteria Content and Cost of Production under the "North" System

Farm	Av. bacteria count for 6 mo.	Cost per qut. milk
A	7,606	$ 0.0565
B	10,025	0.0705
C	31,133	0.03675
D	41,235	0.03385

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The average cost on farms A and B together is 6.35 cents a quart. On farms C and D it is 3.53 cents a quart. The difference in cost of production is 2.82 cents a quart. The higher cost is on the farms producing the cleaner milk.

This study shows that the "North" system of milk production as operated at Sparks, Md., has failed to result in a milk averaging less than 10,000 bacteria per cubic centimeter. It also shows that where the farmer produces a fairly clean milk the extra expense occurred amounts to more than one cent a quart.

V - Important Problems in the Certified Milk Industry

1 - Lack of Adequate Profit to Producers

The study of certified milk in New York showed that the majority of producers feel that the business is unprofitable. The Dairy Division of the Federal Department of Agriculture found the same to be true in its investigations. This condition constitutes one of the most important problems in the certified milk industry. It is due in part, no doubt, to inefficient management by dairymen. It is due in part to the lack of public appreciation of the real value of certified milk. Still another measure of blame for this condition rests with certain rich men who produce certified milk without regard to profit or loss. If improvement is to be secured in the matter of profit to producers of certified milk, it probably will have to come through education of the public, and through the application of better methods to the business.

2 - Lack of Uniformity in Requirements

Table XII shows some of the requirements enforced by different commissions.

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TABLE XI

Requirements by Milk Commissions, 1911-12

Name of Commission	Maximum Bacteria per c. c.	Minimum Fat %	Minimum Temp. Deg. F.	Kind of Floor	Window Surface per Cow Square feet
Fayette Co.,Ky.	10,000	3.5	45	Concrete	4
Co. of N.Y.,N.Y.	30,000	4.0	45		"plenty"
Kings Co., N.Y.	10,000	4.0	45	"tight"	"plenty"
Monroe Co.,N.Y.	10,000	3.6			
Broome Co.,N.Y.	10,000	4.0	45	Wood or Concrete	2
Elmira Med. Ac.			45		"plenty"
Albany Co.,N.Y.	10,000	4.0	50	Wood or Concrete	"plenty"
Dutchess Co., "	30.000	4.0	50	Concrete	"plenty"

It may be noted that the bacterial standard varies from 6,000 to 30,000 per cubic centimeter. The requirement for a minimum per cent. of fat varies from 3.5 to 4.0. For temperature of milk, 5 commissions had a standard of 45 degrees Fahrenheit within 1 hour after milking, 1 had a standard of 50 degrees Fahrenheit for the same time, and 1 had a standard of 55 degrees Fahrenheit within 3 hours, and 50 degrees within 2 hours after the milk was drawn. Under such conditions the certified milk which is produced under one commission undoubtedly is very different from that produced under another commission. The dairyman who would supply several commissions with milk is embarrassed by a diversity in rules. Uniformity in regulations would result in a uniform and standard product.

3 - Lack of Proper State Legislation

In a number of states to-day the producer of certified milk may be placed in the very awkward position of having to obey a set of rules laid down by a milk commission, and another and

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quite contradictory set of rules laid down by the city board of health. It is possible, too, for boards of health to undertake to certify milk. These conditions are unfortunate, and should be remedied by legislative enactment. In order to secure proper and uniform state legislation, The American Association of Medical Milk Commissions and The Certified Milk Producers' Association of America should unite in adopting a set of rules and standards; should draft a model law that would recognize and define the medical milk commission and its activities; and should urge the adoption of such bill by the different state legislatures. The bill should recognize the set of rules and standards as approved from year to year by the two associations, and should give the local medical milk commissions sole authority to certify milk.

The two associations should be able to continue to work harmoniously by creating a board of appeal which should hear and decide all questions of dispute relative to standards and rules.

VI - Summary

Certified milk was first produced in 1893 in New Jersey.

No milk should be called "certified" that is not produced under the supervision of a medical milk commission and certified by such commission.

To secure milk that is known to be safe as a food, it is necessary to make frequent inspections of stables, cows , and attendants, and of the milk itself. These inspections are arranged by the milk commission, and are paid for by the dairyman. Members of milk commissions work without pay.

Most of the certified milk in the United States

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is produced around New York, Boston, and Philadelphia.

The production of certified milk is unprofitable on the majority of certified dairy farms. The cost of production probably averages between 8 and 11 cents a quart.

Because of the high cost of producing certified milk by the original method, a new method called "The North System" has been proposed. The "North" system of milk production in operation at Sparks, Md., has failed to produce the results claimed for it. It has not resulted in a milk of certified grade, nor was clean milk produced under the system at an extra cost of less than one cent a quart.

There is great variation in the regulations and standards formulated by different commissions. This condition is a serious handicap to the certified milk business, and calls for the attention of producers and commissions.

Because many states have no legislation on the subject, municipal health boards find it possible to interfere with the work of medical milk commissions, and are able to undertake to certify milk on their own account, if they desire to do so. In one or two states unwise laws have been enacted, and the need for uniformity in state legislation has become apparent. The American Association of Medical Milk Commissions and The Certified Milk Producers' Association of America should unite in adopting a uniform set of regulations and standards, and in drafting a model bill and urging all state legislatures to enact it into law.

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APPROVED

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